



Level I Process Guide

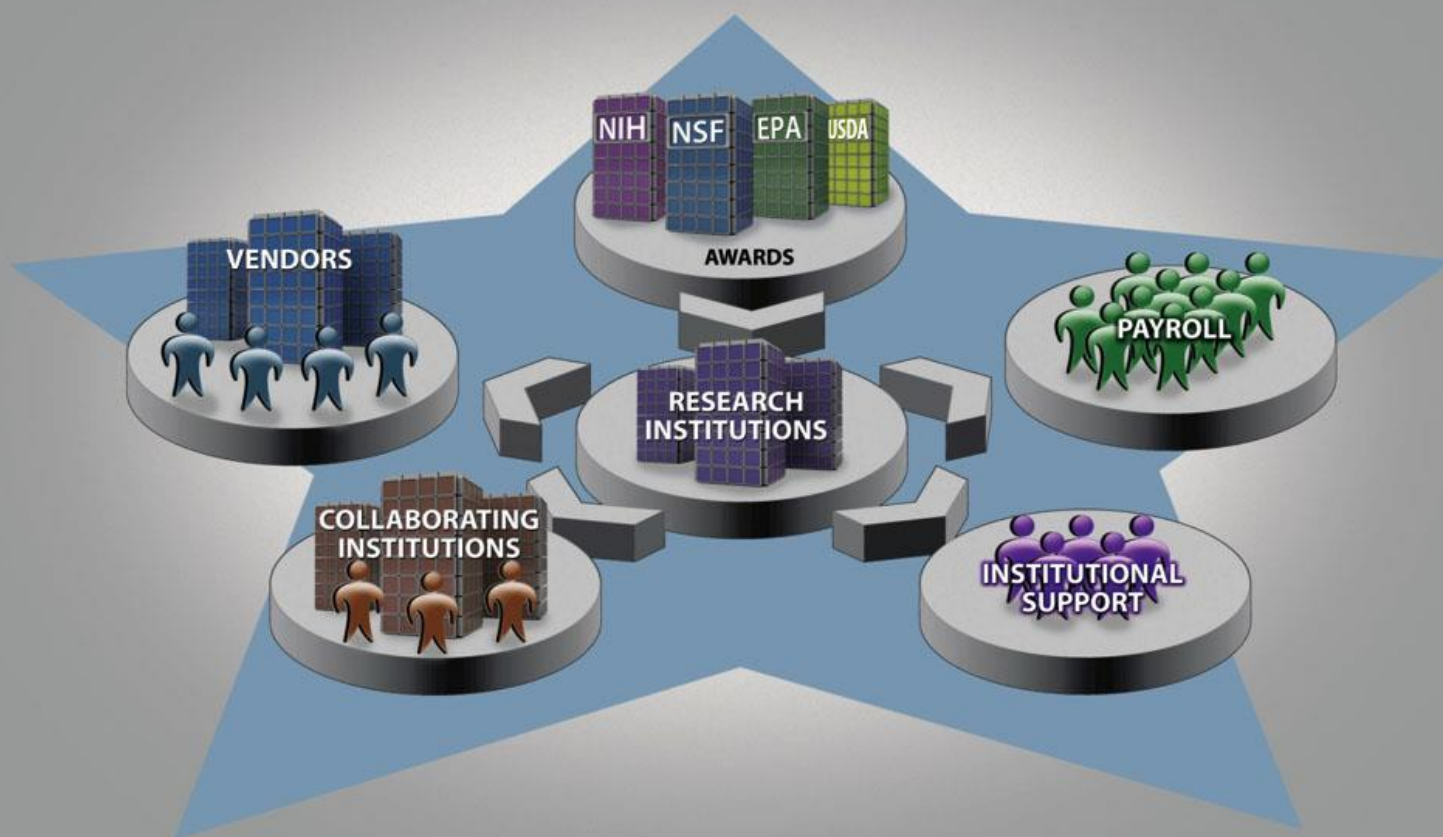


Table of Contents

| | |
|---|----|
| 1. Overview | 3 |
| 2. Schematics of STAR METRICS Level I | 4 |
| 3. Website | 5 |
| 3.1. User Authentication | 5 |
| 3.2. Dashboard | 5 |
| 3.3. File upload | 5 |
| 3.4. Technology Stack | 6 |
| 4. Database Structure | 7 |
| 4.1. Tables | 7 |
| 4.2. List of DB tables | 8 |
| 4.3. Pseudo Code for the component that is used to insert/update the DB from data in the Submitted files as uploaded by the institutions | 9 |
| 4.4. Schematic of the SAS Process Database Model | 10 |
| 5. SAS Process | 11 |
| 5.1. SAS Process Execution | 11 |
| 5.1.1. PROCESS_STAGE_SASDB_BUILD.sas | 11 |
| 5.1.2. RUN_INSTITUTION.sas | 12 |
| 5.1.3. CONTROL_PATH.sas | 13 |
| 5.2. List of SQL Views as used by the SAS process | 16 |
| 5.3. CODE Folder | 17 |
| 6. Appendix A: Technical Specifications | 19 |
| 7. Appendix B: XSD Code | 30 |

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1. Overview

The STAR METRICS Level I activity was a partnership between science agencies and research institutions to document a partial set of science investment outcomes to the public. In support of the White House's directives for open and transparent government, the STAR METRICS program sought to provide a common empirical data and analytic infrastructure for recipients of federal R&D funding to facilitate the sharing of data, interpretation of results, and to understand what "impacts" federal funds spent for R&D.

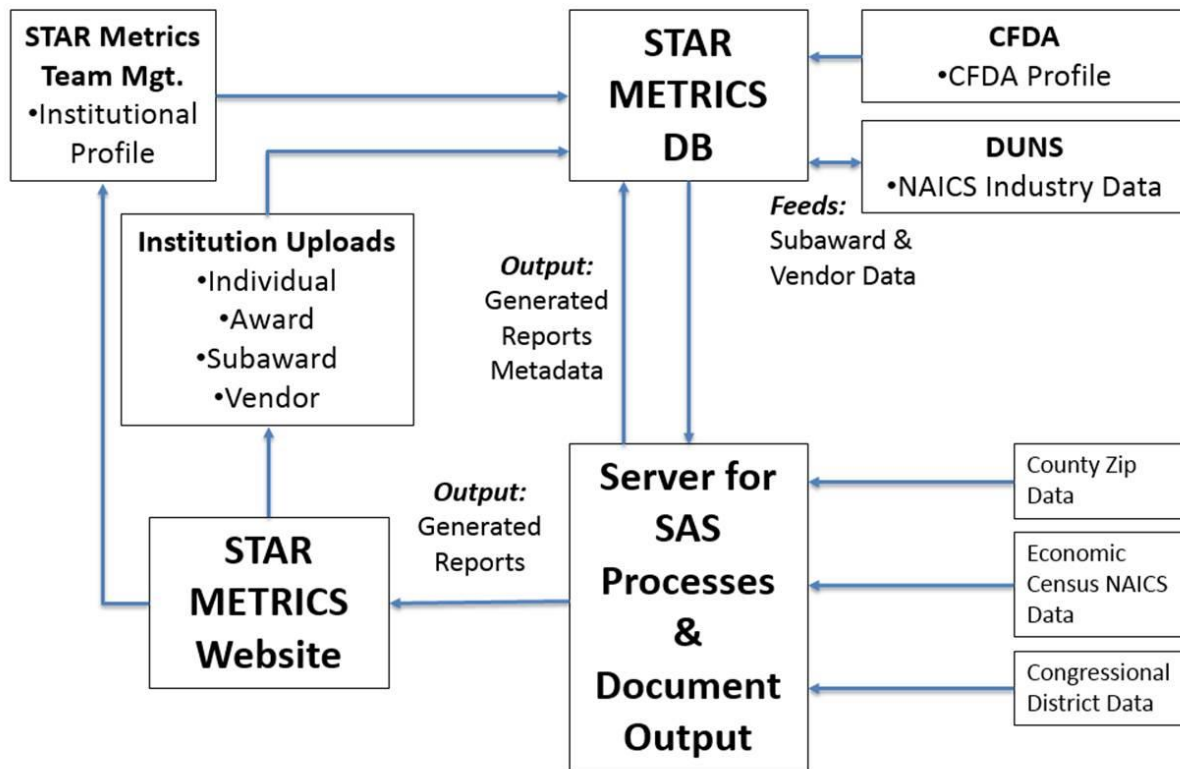
STAR METRICS Level I provides a way of collecting information and calculating the initial employment effects of Science and Technology (S&T) awards using the administrative and accounting records of research institutions. The information in this document reflects the components and steps in the process.

STAR METRICS Level I program collects 14 data elements from the participating institutions. These elements are then used to calculate employment supported by Federal grants in four different categories:

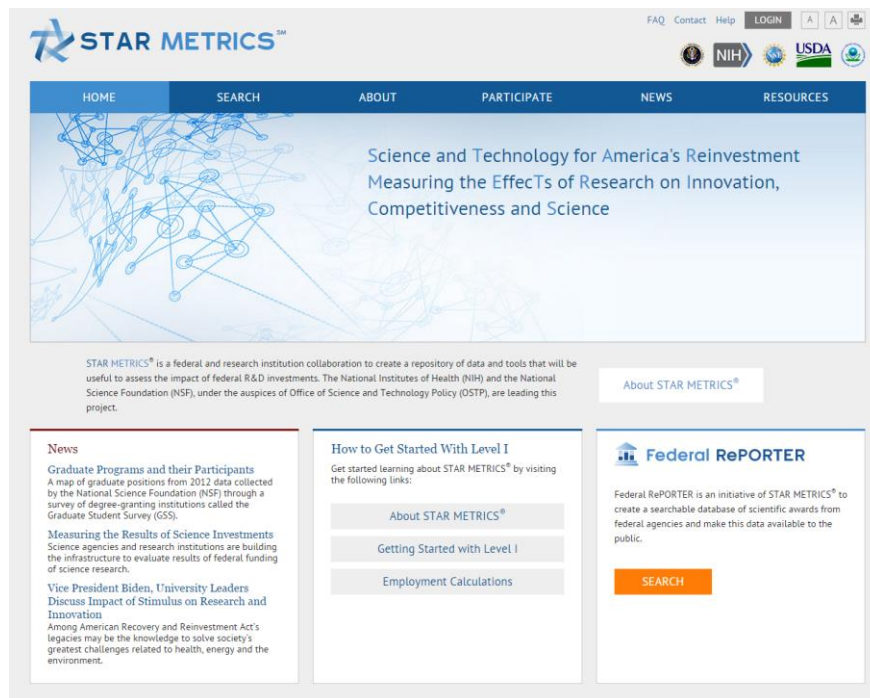
1. Jobs supported that appear on research institution payroll
2. Jobs supported by research institution spending for the purchase of goods and services
3. Jobs supported by research institution spending on sub-awards
4. Jobs supported by research institutions Facilities & Administration (F&A) costs, also known as indirect costs

The participating institutions are able to transmit this data securely through to NIH Central IT via the STAR METRICS website.

2. Schematics of STAR METRICS Level I



3. Website



The STAR METRICS website is responsible for the user authentication, the data file upload process, submitted files validation, user and institution profiles management dashboard, and the report generation process.

3.1. User Authentication

- a. As a system administrator, users can be added/modified or disabled using the Star Metrics website.
- b. Depending on the role assigned to the user, different portions of the management dashboard will be visible.

3.2. Dashboard

- a. The dashboard part of the site allows the user to upload input files, manage the institution's global settings, download the reports and see the overall status of the submissions.

3.3. File upload

- a. When a file (either CSV or XML) is uploaded, the front-end validation website modules check the structure and contents of the files. If there are extra columns or the file contains invalid data, the site will notify the user. In case of errors, the file contents are not converted for storage in the SQL Server, but the file issues are logged and users are notified of the errors discovered. For additional information regarding specifications of the data files, please see the 'Data Submission Technical Specifications' in Appendix A.

- b. Once the file is successfully validated, the contents are converted to binary data and stored in the data_submission_file table.
- c. Once the “Ready for Reporting” button is selected by the user, the flag in the database is set and the files are ready for the SAS process.

3.4. Technology Stack

Below please find the list of technologies that are used to support the STAR METRICS Level I program.































































































































- .NET 4.5
- SQL Server 2008
- SAS 9.3 32 bit

4. Database Structure

4.1. Tables

Please see [Level I Entity Relationship Model](#).

4.2. List of DB tables

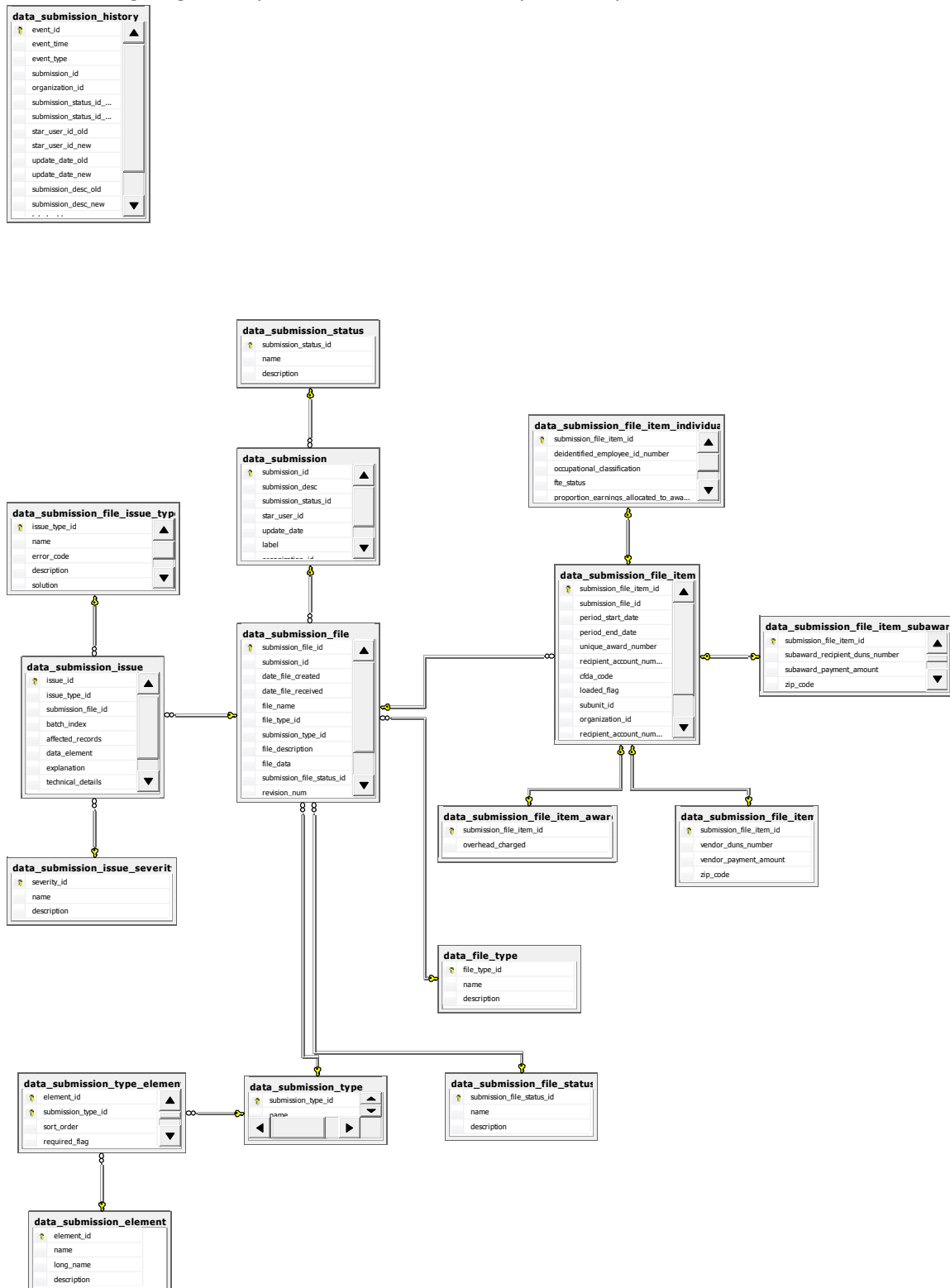
| | |
|---|--|
|   <code>dbo.award</code> |   <code>dbo.naics_code</code> |
|   <code>dbo.award_agency</code> |   <code>dbo.organization</code> |
|   <code>dbo.award_period_details</code> |   <code>dbo.organization_job_classification</code> |
|   <code>dbo.award_staff</code> |   <code>dbo.organization_naics</code> |
|   <code>dbo.award_type</code> |   <code>dbo.organization_ownership_type</code> |
|   <code>dbo.cfda</code> |   <code>dbo.organization_party_role</code> |
|   <code>dbo.cost_proposal</code> |   <code>dbo.organization_system</code> |
|   <code>dbo.country</code> |   <code>dbo.organization_type</code> |
|   <code>dbo.data_file_type</code> |   <code>dbo.other_funding_source</code> |
|   <code>dbo.data_submission</code> |   <code>dbo.participant_organization</code> |
|   <code>dbo.data_submission_element</code> |   <code>dbo.party</code> |
|   <code>dbo.data_submission_file</code> |   <code>dbo.party_type</code> |
|   <code>dbo.data_submission_file_issue_type</code> |   <code>dbo.person</code> |
|   <code>dbo.data_submission_file_item</code> |   <code>dbo.project_update</code> |
|   <code>dbo.data_submission_file_item_award</code> |   <code>dbo.region</code> |
|   <code>dbo.data_submission_file_item_individual</code> |   <code>dbo.report_type</code> |
|   <code>dbo.data_submission_file_item_subawards</code> |   <code>dbo.reporting_period_type</code> |
|   <code>dbo.data_submission_file_item_vendor</code> |   <code>dbo.reporting_queue</code> |
|   <code>dbo.data_submission_file_status</code> |   <code>dbo.reporting_queue_status</code> |
|   <code>dbo.data_submission_history</code> |   <code>dbo.reporting_queue_submission</code> |
|   <code>dbo.data_submission_issue</code> |   <code>dbo.role</code> |
|   <code>dbo.data_submission_issue_severity</code> |   <code>dbo.role_type</code> |
|   <code>dbo.data_submission_status</code> |   <code>dbo.star_job_classification</code> |
|   <code>dbo.data_submission_type</code> |   <code>dbo.star_organization_user_role</code> |
|   <code>dbo.data_submission_type_element</code> |   <code>dbo.star_role</code> |
|   <code>dbo.duns</code> |   <code>dbo.star_user</code> |
|   <code>dbo.duns_batch_processing</code> |   <code>dbo.star_user_role</code> |
|   <code>dbo.duns_processing_status</code> |   <code>dbo.unknown_user_logon</code> |
|   <code>dbo.employee</code> |   <code>dbo.uploaded_report</code> |
|   <code>dbo.event</code> | |
|   <code>dbo.event_notification_digest</code> | |
|   <code>dbo.event_notification_digest_event</code> | |
|   <code>dbo.event_type</code> | |
|   <code>dbo.geographic_region</code> | |

4.3. Pseudo Code for the component that is used to insert/update the DB from data in the Submitted files as uploaded by the institutions

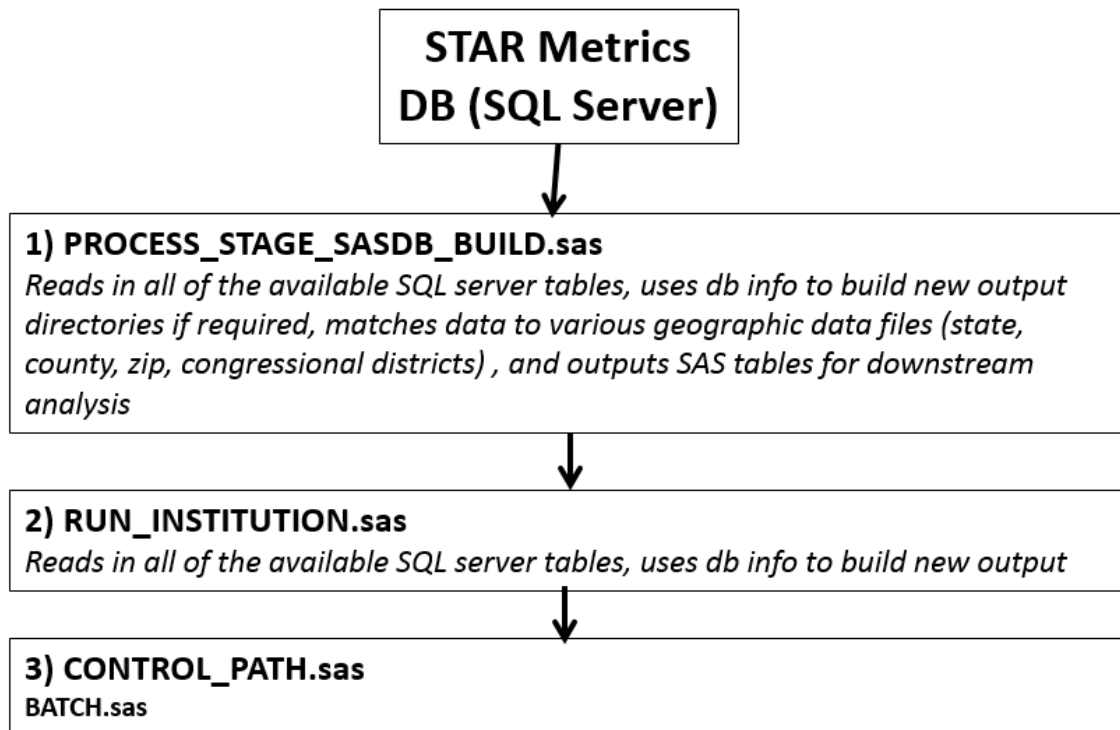
- a. Each file submitted is assigned an ID and added to the data_submission table, along with identifying information.
 - i. The submission is assigned a status (linked to the data_submission_status table)
- b. The file data is then added to the data_submission_file table. The data is converted from the XML or CSV format into a binary string and added to the file_data column.
 - i. The type of submission is keyed to the data_submission_type table, which also defines the required fields through the data_submission_type_element and data_submission_element tables.
 - ii. The file status is stored and keyed to the data_submission_file_status table.
 - iii. Any issues found in the validation process are assigned an issue_id and added to the data_submission_issue table, which keys to the data_submission_file_issue_type and data_submission_issue_severity tables to display warnings and issues on the STAR METRICS website interface.
 - iv. Rows/records that pass validation are keyed on the submission_file_id and added to the data_submission_file_item table.
 1. The data_submission_file_item table has a separate row for each successfully validated record in the file. This table is generic to the type of submission (recorded in the main data_submission_file table as submission_type_id) and contains fields that are located and required in all 4 types of submission.
 2. Based on the type of submission, additional information is recorded in the data_submission_file_item_individual, data_submission_file_item_subaward, data_submission_file_item_award, and data_submission_file_item_vendor tables. These tables are joined to the data_submission_file_item table through the submission_file_item_id.
- B. Reference tables necessary to run the SAS process are as follows:
 - a. Organization: This table defines the organization, including its unique ID, name, DUNS, and location
 - b. Organization_job_classification: This table defines the mapping between organizational job names and the STAR METRICS job classifications (located in star_job_classification). This table is populated dynamically through the Management module of the STAR METRICS web site – where job classifications can be updated or changed ([STAR METRICS Job Classification Guidelines](#)).
 - c. Cfda: This table contains up to date CFDA codes and titles (used in report generation).
- C. DDL to generate the DB structure as described above is attached.

4.4. Schematic of the SAS Process Database Model

D. The following diagram depicts data model as used by the SAS process:



5. SAS Process
















SAS Version used: 9.3 (32 bit)

5.1. SAS Process Execution

5.1.1. PROCESS_STAGE_SASDB_BUILD.sas

- a. This file is run manually after the “Ready for Reporting” button has been selected on the website and all 4 input files have been successfully validated.
 - i. If the button is selected without a complete set of files, the report will be run but will be incomplete.
 - ii. If the SASDB Build process is run without selecting the “Ready for Reporting” button (please see section File upload), the new input files will NOT be inserted into the generated SAS tables and therefore the new data will not be included in the generated report.
- b. This file reads through the connected SQL Server data files and extracts them into separate tables (both SQL and SAS) for use in step 2.
- c. The first output is a set of SAS tables used by Step 2 for analysis:

| | | | | |
|---|---------------------|-------------------|--------------------|--------------|
|  | cfda | 4/28/2015 6:36 PM | SAS Data Set | 561 KB |
|  | fundingsource | 4/28/2015 6:36 PM | SAS Data Set | 401 KB |
|  | institutionprofile | 4/28/2015 6:36 PM | SAS Data Set | 65 KB |
|  | lastaward | 4/28/2015 6:50 PM | SAS Data Set | 734,465 KB |
|  | lastaward | 4/28/2015 6:50 PM | SAS Data Set Index | 66,673 KB |
|  | lastindividual | 4/28/2015 6:50 PM | SAS Data Set | 2,275,729 KB |
|  | lastindividual | 4/28/2015 6:50 PM | SAS Data Set Index | 152,033 KB |
|  | lastsubaward | 4/28/2015 6:50 PM | SAS Data Set | 91,633 KB |
|  | lastsubaward | 4/28/2015 6:50 PM | SAS Data Set Index | 6,257 KB |
|  | lastvendor | 4/28/2015 6:51 PM | SAS Data Set | 3,210,129 KB |
|  | lastvendor | 4/28/2015 6:51 PM | SAS Data Set Index | 210,897 KB |
|  | reportingperiodtype | 4/28/2015 6:36 PM | SAS Data Set | 33 KB |
|  | sasqueue | 4/28/2015 6:36 PM | SAS Data Set | 9 KB |

- i. These tables are full datasets comprising all data in the SQL Server DB.
 - ii. These files are located in C:\STAR_SHARED\SQL Extract
- d. The second output is an updated RUN_INSTITUTION.sas for every institution in the SQL Server DB. These files are output in individual institution folders in Z:\Analysis\STAR_INSTITUTION.

5.1.2. RUN_INSTITUTION.sas

```
%include "Z:\CODE\CONTROL_PATH.sas";
%control_path(org=Z_STAR_Test_University ,
state=CA ,
campus_sum=NO,
org_selects=%str(where=(organization_id=110 and campus_id='000' )));
*****;
*** Suggested Date Ranges *****;
*****;
%put_parms(mindate=01JAN2000,maxdate=30SEP2013);

*****;
** Min Date from Individual Table =01JAN2012);
** Max Date from Individual Table =30SEP2013);
*****;
%cp;
```









- e.
- f. This file sets the variables for Step 3 (CONTROL_PATH.sas)
- g. The variables are as follows:
 - i. Org = the org name as defined by the SQL Server DB (and as it will be output in the directory structure)
 - ii. State = the state in which the organization is located
 - iii. Campus_Sum
 - 1. Can be 2 values: YES or NO. For institutions with a single campus, this value should always be NO. For institutions with sub-campus, this value should be NO for sub-campus reports and YES for consolidated reports.
 - iv. Organization_id = The organization ID as set by the STAR METRICS website and SQL Server DB

- v. Campus_Id = The selected institution's campus ID (will be '000' for all single campus institutions)
- vi. Mindate = The date from which to begin loading data (will default to 01JAN2000 – this syntax must be maintained for the process to run correctly)
- vii. Maxdate = The date at which to stop loading data (will default to the latest possible date read from the SQL Server DB)
 - 1. Both mindate/maxdate values as read from the SQL Server DB will be output in the comment below these variables
- h. User updates:
 - i. The user can make the following updates to the file:
 - 1. Campus_Sum should be set to 'YES' for consolidated reports
 - 2. Campus_id – The 'and campus_id = 'xxx'' clause should be deleted for consolidated reports
 - 3. Maxdate – this can be set to the end of any quarter to run the report for that specific quarter
 - i. When this file is run in SAS, CONTROL_PATH.sas will be called for the variables as described in the file.







5.1.3. CONTROL_PATH.sas

- j. This file is run when the RUN_INSTITUTION.sas file is run and uses the variables located in that file.
- k. The following processes are carried out when this file is called:
 - i. Copies latest Word and Excel Templates to C:\STAGING
 - ii. Executes initial QC check:
 - 1. CFDA_EXCEPTION_REPORT_V2.sas
 - iii. Conditionally executes creation of special Award Extract files for matching to Agency Files (NSF & NIH).
 - 1. EXPORT_MASTER_AWARD_FILES.sas
 - 2. STAR_AWARD_EXTRactions.sas
 - iv. Initial setup of ZIP code and CFDA Lookups/Formatting
 - 1. PROCESS_STAGE_1_TABLE_PREP.sas
 - v. Processes and applies Lookups, Creates QC Reports
 - 1. PROCESS_STAGE_2_VENDOR.sas
 - 2. PROCESS_STAGE_2_SUBAWARD.sas
 - 3. PROCESS_STAGE_2_AWARD.sas
 - 4. PROCESS_STAGE_2_INDIVIDUAL.sas
 - vi. Dating of Data
 - 1. PROCESS_STAGE_3_TABLES.sas
 - vii. Deletes previously created Institution Specific Access Databases (located in local C:\STAGING folder)
 - viii. Formats values for date based and award level reporting
 - 1. PROCESS_STAGE_4_TABLES_PREP.sas
 - ix. Creates initial summary files
 - 1. PROCESS_STAGE_5_AWARD.sas
 - 2. PROCESS_STAGE_5_VENDOR.sas


3. PROCESS_STAGE_5_SUBAWARD.sas
4. PROCESS_STAGE_5_INDIVIDUAL.sas
- x. Conditionally executes creation of Special Award Analytic Extract files.
 1. EXPORT_ANALYSIS_AWARD_FILES.sas
- xi. Creates and exports final summary files
 1. PROCESS_STAGE_6_EXPORT_INDIVIDUAL.sas
 2. PROCESS_STAGE_6_EXPORT_AWARD.sas
 3. PROCESS_STAGE_6_EXPORT_VENDOR.sas
 4. PROCESS_STAGE_6_EXPORT_SUBAWARD.sas
 5. PROCESS_STAGE_6_EXPORT_COMBINED.sas
 6. PROCESS_STAGE_6_EXPORT_INDIVIDUAL_EXTRA.sas
 7. PROCESS_STAGE_6_EXPORT_GEO.sas
- xii. Creates map JPEG files
 1. PROCESS_STAGE_7_MAP_LOCAL.sas
 2. PROCESS_STAGE_6_MAP_NATIONAL.sas
- xiii. Refreshes and updates Excel and Word documents
 1. Executes C:\STAGING\ExcelRefresher.exe
 2. Executes C:\STAGING\WordRefresher.exe
- xiv. Copies Excel and Word documents to Institution specific folder
- I. The output files from this process are located in the C:\STAGING\ folder:
 - i. Map JPEGs:

| | | | | |
|---|--|-------------------|------------|-------|
|  | LOCAL_ALL_LATEST_Direct Jobs though Vendor, Subawards, Su... | 4/29/2015 6:12 PM | JPEG image | 78 KB |
|  | LOCAL_FEDALL_LATEST_Direct Jobs though Vendor, Subawards,... | 4/29/2015 6:12 PM | JPEG image | 74 KB |
|  | LOCAL_FEDSCI_LATEST_Direct Jobs though Vendor, Subawards,... | 4/29/2015 6:12 PM | JPEG image | 74 KB |
|  | LOCAL_SCI_LATEST_Direct Jobs though Vendor, Subawards, Su... | 4/29/2015 6:12 PM | JPEG image | 68 KB |
|  | NATIONAL_ALL_LATEST_Direct Jobs though Vendor, Subawards,... | 4/29/2015 6:12 PM | JPEG image | 90 KB |
|  | NATIONAL_FEDALL_LATEST_Direct Jobs though Vendor, Subawa... | 4/29/2015 6:12 PM | JPEG image | 89 KB |
|  | NATIONAL_FEDSCI_LATEST_Direct Jobs though Vendor, Subawa... | 4/29/2015 6:12 PM | JPEG image | 90 KB |
|  | NATIONAL_SCI_LATEST_Direct Jobs though Vendor, Subawards,... | 4/29/2015 6:12 PM | JPEG image | 91 KB |







ii. Institution-specific Access DBs:

| | | | | |
|---|-----------------|-------------------|--------------------------|------------|
|  | STAR_AWARD | 4/29/2015 6:11 PM | Microsoft Access Data... | 42,452 KB |
|  | STAR_COMBINED | 4/29/2015 6:11 PM | Microsoft Access Data... | 75,078 KB |
|  | STAR_GEO | 4/29/2015 6:12 PM | Microsoft Access Data... | 5,326 KB |
|  | STAR_INDIVIDUAL | 4/29/2015 6:11 PM | Microsoft Access Data... | 133,652 KB |
|  | STAR_SUBAWARD | 4/29/2015 6:11 PM | Microsoft Access Data... | 2,652 KB |
|  | STAR_VENDOR | 4/29/2015 6:11 PM | Microsoft Access Data... | 26,722 KB |






iii. Excel files used for QC:

| | | | |
|---|-------------------|--------------------------|----------|
|  FILES_SUBMITTED | 4/29/2015 6:06 PM | Microsoft Excel Comma... | 5 KB |
|  INSTITUTIONAL_PROFILE | 4/29/2015 6:09 PM | Microsoft Excel Comma... | 1 KB |
|  QC_CFDA_AWARD_EXCEPTIONS | 4/29/2015 6:05 PM | Microsoft Excel Comma... | 62 KB |
|  QC_CFDA_EXCEPTIONS | 4/29/2015 6:05 PM | Microsoft Excel Comma... | 1 KB |
|  QC_FILES_AWARD | 4/29/2015 6:05 PM | Microsoft Excel Comma... | 1 KB |
|  QC_FILES_INDIVIDUAL | 4/29/2015 6:06 PM | Microsoft Excel Comma... | 2 KB |
|  QC_FILES_SUBAWARD | 4/29/2015 6:05 PM | Microsoft Excel Comma... | 1 KB |
|  QC_FILES_VENDOR | 4/29/2015 6:05 PM | Microsoft Excel Comma... | 2 KB |
|  QC_INDIVIDUAL_ALLOCATION | 4/29/2015 6:06 PM | Microsoft Excel Comma... | 1,286 KB |
|  QC_JOB_CROSSREF | 4/29/2015 6:06 PM | Microsoft Excel Comma... | 57 KB |
|  QC_TABLE_STATS_AWARD | 4/29/2015 6:05 PM | Microsoft Excel Comma... | 7 KB |
|  QC_TABLE_STATS_AWARD_CFDA | 4/29/2015 6:05 PM | Microsoft Excel Comma... | 161 KB |
|  QC_TABLE_STATS_INDIVIDUAL | 4/29/2015 6:06 PM | Microsoft Excel Comma... | 8 KB |
|  QC_TABLE_STATS_SUBAWARD | 4/29/2015 6:05 PM | Microsoft Excel Comma... | 79 KB |
|  QC_TABLE_STATS_VENDOR | 4/29/2015 6:05 PM | Microsoft Excel Comma... | 140 KB |

iv. Summary Excel files:

| | | | |
|---|-------------------|---------------------------|----------|
|  REPORT_AWARD | 4/29/2015 6:12 PM | Microsoft Excel Worksh... | 1,269 KB |
|  REPORT_COMBINED | 4/29/2015 6:12 PM | Microsoft Excel Worksh... | 2,112 KB |
|  REPORT_GEO | 4/29/2015 6:12 PM | Microsoft Excel Worksh... | 177 KB |
|  REPORT_INDIVIDUAL | 4/29/2015 6:12 PM | Microsoft Excel Worksh... | 466 KB |
|  REPORT_SUBAWARD | 4/29/2015 6:12 PM | Microsoft Excel Worksh... | 30 KB |
|  REPORT_VENDOR | 4/29/2015 6:12 PM | Microsoft Excel Worksh... | 130 KB |

v. Word files

























| | | | |
|---|--------------------|-------------------------|----------|
|  STAR METRICS Report Content_V3 | 2/26/2013 10:48 AM | Microsoft Word Docum... | 21 KB |
|  STAR_APPENDIX | 4/29/2015 6:13 PM | Microsoft Word Docum... | 984 KB |
|  STAR_Metrics_Report_Template_V8L | 4/29/2015 6:13 PM | Microsoft Word Docum... | 3,640 KB |
|  STAR_Metrics_Report_Template_V8L - campus | 4/29/2015 6:13 PM | Microsoft Word Docum... | 3,637 KB |
|  STARMetrics Report File Index (1) | 7/14/2011 11:32 AM | Microsoft Word Docum... | 31 KB |

m. The Excel and Word files are updated from the templates using the provided WordRefresher.exe and ExcelRefresher.exe executables.

i. The templates are located in the Z:\EXCEL_TEMPLATES folder (for summary Excel files), the Z:\STAGING folder (for the QC Excel files), the Z:\STAGING\SINGLE CAMPUS WORD TEMPLATE folder (Word templates for single campus institutions and consolidated multi-campus reports) and the Z:\STAGING\MULTI-CAMPUS WORD TEMPLATE folder (Word templates for sub-campus reports).

n. These files are then copied by the process to the institution specific folder located on the Y: drive. This is used to ensure that a copy of the generated files is maintained even after another report has been run.





5.2. List of SQL Views as used by the SAS process




































- +  `dbo.vwCfda`
- +  `dbo.vwDataSubmissionActive`
- +  `dbo.vwDataSubmissionFileActive`
- +  `dbo.vwEventHistory`
- +  `dbo.vwFundingSource`
- +  `dbo.vwInstitutionProfile`
- +  `dbo.vwJobClassificationMatch`
- +  `dbo.vwOrganization`
- +  `dbo.vwSASProcessingAward`
- +  `dbo.vwSASProcessingIndividual`
- +  `dbo.vwSASProcessingSubAward`
- +  `dbo.vwSASProcessingVendor`
- +  `dbo.vwSASQueue`
- +  `dbo.vwSASQueueAll`
- +  `dbo.vwStarUser`
- +  `dbo.vwStarUserSummary`
- +  `dbo.vwSubmissionFile`
- +  `dbo.vwSubmissionFileCompleteAndValidated`
- +  `dbo.vwSubmissionFileItem`
- +  `dbo.vwSubmissionFileItemDuns`
- +  `dbo.vwSubmissionFileItemJobClass`
- +  `dbo.vwSubmissionHistory`
- +  `dbo.vwSubmissionTypeElement`
- +  `dbo.vwSubmissionTypeElementList`

These views are used by the SAS process (step 2) to generate SAS tables for analysis.

5.3. CODE Folder

The code folder contains the generic SAS files/processes needed to generate an institutional report. The majority of these files are run during the institutional process (see section RUN_INSTITUTION.sas). The general SAS process flow is as follows:

| | | | |
|---|----------------------|---------------|--------|
|  AWARD_TOPIC_SELECT.sas | 3/26/2012 3:39 PM | SAS File | 1 KB |
|  BATCH.sas | 8/22/2013 11:08 PM | SAS File | 7 KB |
|  BATCH_MULTI_SCHOOL_V2.sas | 10/24/2012 11:21 ... | SAS File | 41 KB |
|  BATCH_NATIONAL.sas | 10/24/2012 11:21 ... | SAS File | 12 KB |
|  CENSUS.sas | 8/19/2013 12:03 A... | SAS File | 2 KB |
|  CENSUS_ARCINFO_CONGRESS.sas | 6/26/2011 10:09 A... | SAS File | 1 KB |
|  CENSUS_MSA.sas | 9/2/2011 10:34 PM | SAS File | 2 KB |
|  CENSUS_NAICS_ECON.sas | 9/5/2011 3:39 AM | SAS File | 7 KB |
|  CENSUS_NAICS_ECON_MSA.sas | 9/28/2012 11:18 A... | SAS File | 7 KB |
|  CENSUS_NAICS_ECON_STATE.sas | 8/19/2013 12:03 A... | SAS File | 2 KB |
|  CENSUS_NAICS_ECON_US.sas | 8/19/2013 12:03 A... | SAS File | 2 KB |
|  CENSUS_NAICS_ECON_V5.sas | 8/19/2013 12:03 A... | SAS File | 10 KB |
|  CFDA_EXCEPTION_REPORT_V2.sas | 11/5/2012 1:58 AM | SAS File | 9 KB |
|  CONGRESSIONAL_ZIPS.log | 10/17/2014 12:02 ... | Text Document | 7 KB |
|  CONGRESSIONAL_ZIPS.sas | 10/17/2014 12:01 ... | SAS File | 3 KB |
|  CONGRESSIONAL_ZIPS_NONGOV_SOUR... | 7/6/2011 1:02 PM | SAS File | 4 KB |
|  CONTROL_PATH.sas | 8/10/2013 2:47 PM | SAS File | 12 KB |
|  CONTROL_PATH_BATCH.sas | 10/24/2012 11:22 ... | SAS File | 1 KB |
|  CONTROL_PATH_DATA_PREP.sas | 8/27/2010 5:41 PM | SAS File | 4 KB |
|  COUNTY_ZIP.sas | 8/18/2013 11:51 PM | SAS File | 2 KB |
|  CUMULATIVE_INDIVIDUALS_FTES.sas | 4/27/2011 4:38 PM | SAS File | 1 KB |
|  EXPORT_ANALYSIS_FILES.sas | 12/23/2011 11:57 ... | SAS File | 4 KB |
|  EXPORT_FILES_SUBMITTED.sas | 9/26/2011 6:18 PM | SAS File | 1 KB |
|  EXPORT_MASTER_AWARD_FILES.sas | 9/28/2011 12:42 A... | SAS File | 3 KB |
|  formats.sas7bcat | 4/27/2012 6:02 PM | SAS7BCAT File | 13 KB |
|  INSTITUTIONAL_PROFILES_V2.sas | 11/2/2012 5:26 PM | SAS File | 2 KB |
|  PROCESS_STAGE_0_BATCH_REPORT.log | 8/27/2013 11:47 PM | Text Document | 202 KB |
|  PROCESS_STAGE_0_BATCH_REPORT.sas | 5/4/2014 7:46 PM | SAS File | 30 KB |
|  PROCESS_STAGE_1_TABLES_PREP.sas | 4/6/2013 3:56 PM | SAS File | 9 KB |
|  PROCESS_STAGE_2_AWARD.sas | 11/4/2012 2:09 PM | SAS File | 4 KB |
|  PROCESS_STAGE_2_INDIVIDUAL.sas | 7/8/2013 9:04 PM | SAS File | 10 KB |

| | | | |
|--|----------------------|---------------|----------|
|  PROCESS_STAGE_2_SUBAWARD.sas | 11/4/2012 2:08 PM | SAS File | 4 KB |
|  PROCESS_STAGE_2_TOPICS.sas | 6/5/2012 9:40 PM | SAS File | 13 KB |
|  PROCESS_STAGE_2_VENDOR.sas | 11/4/2012 2:05 PM | SAS File | 4 KB |
|  PROCESS_STAGE_3_TABLES.sas | 12/16/2011 5:40 A... | SAS File | 8 KB |
|  PROCESS_STAGE_4_TABLES_PREP.sas | 11/30/2012 7:03 PM | SAS File | 10 KB |
|  PROCESS_STAGE_5_AWARD.sas | 4/15/2013 4:38 PM | SAS File | 8 KB |
|  PROCESS_STAGE_5_INDIVIDUAL.sas | 4/15/2013 5:41 PM | SAS File | 8 KB |
|  PROCESS_STAGE_5_SUBAWARD.sas | 4/15/2013 5:41 PM | SAS File | 7 KB |
|  PROCESS_STAGE_5_VENDOR.sas | 4/15/2013 5:41 PM | SAS File | 6 KB |
|  PROCESS_STAGE_6_EXPORT_AWARD.sas | 11/19/2012 9:55 PM | SAS File | 3 KB |
|  PROCESS_STAGE_6_EXPORT_COMBINED.... | 1/25/2013 3:32 PM | SAS File | 11 KB |
|  PROCESS_STAGE_6_EXPORT_GEO.sas | 1/15/2013 1:49 PM | SAS File | 10 KB |
|  PROCESS_STAGE_6_EXPORT_GEO_CD.sas | 1/15/2013 2:29 PM | SAS File | 9 KB |
|  PROCESS_STAGE_6_EXPORT_INDIVIDUAL... | 1/15/2013 11:46 A... | SAS File | 14 KB |
|  PROCESS_STAGE_6_EXPORT_INDIVIDUAL... | 11/4/2012 11:25 A... | SAS File | 4 KB |
|  PROCESS_STAGE_6_EXPORT_SUBAWARD... | 11/19/2012 10:19 ... | SAS File | 3 KB |
|  PROCESS_STAGE_6_EXPORT_TOPICS.sas | 3/26/2012 12:36 PM | SAS File | 17 KB |
|  PROCESS_STAGE_6_EXPORT_TOPICS_V2.s... | 11/4/2012 11:24 A... | SAS File | 16 KB |
|  PROCESS_STAGE_6_EXPORT_VENDOR.sas | 11/13/2012 11:14 ... | SAS File | 4 KB |
|  PROCESS_STAGE_7_MAP_LOCAL.sas | 8/2/2013 8:04 PM | SAS File | 19 KB |
|  PROCESS_STAGE_7_MAP_LOCAL_ADHOC.... | 4/18/2013 10:14 A... | SAS File | 19 KB |
|  PROCESS_STAGE_7_MAP_NATIONAL.sas | 8/2/2013 7:42 PM | SAS File | 14 KB |
|  PROCESS_STAGE_SASDB_BUILD.log | 4/28/2015 6:52 PM | Text Document | 1,043 KB |
|  PROCESS_STAGE_SASDB_BUILD.sas | 8/4/2013 3:16 PM | SAS File | 15 KB |
|  QC_ALLOCATION.sas | 5/2/2013 6:43 PM | SAS File | 4 KB |
|  QC_ARRA_BUILD.sas | 7/11/2010 3:14 AM | SAS File | 4 KB |
|  QC_DATE_CHECK.sas | 4/12/2013 1:44 PM | SAS File | 3 KB |
|  QC_DATE_CHECK_V2.sas | 8/20/2013 12:12 A... | SAS File | 12 KB |
|  QC_DATE_RANGE.sas | 10/15/2012 9:52 PM | SAS File | 1 KB |
|  QC_VALUES_COUNTS.sas | 7/25/2011 12:04 PM | SAS File | 2 KB |
|  RUN_INSTITUTION.sas | 11/6/2012 1:43 PM | SAS File | 1 KB |
|  STAR_DIRECTORY_BUILD_V3.sas | 8/4/2013 10:47 PM | SAS File | 4 KB |
|  STAR_DIRECTORY_RENAME.sas | 1/6/2013 2:27 PM | SAS File | 3 KB |
|  SUBAWARD_VENDOR_AWARD_CORREC... | 4/15/2013 5:41 PM | SAS File | 7 KB |
|  TEST_RUN_INSTITUTION.sas | 8/4/2013 11:14 PM | SAS File | 1 KB |

6. Appendix A: Technical Specifications

Introduction

The following information provides guidance on the technical specifications for data files to be submitted as a part of Level I of the STAR METRICS® project.

As previously noted, if the research institution was using XML to send these files, this guide together with the XSD code provided (See Appendix B) outlines how to produce a readable XML file. If the research institution was providing data via CSV files this guide outlines the minimum requirements needed for the data system as well as suggested formatting.

Process

Once a file is submitted to the STAR METRICS® data system, each submission is examined at a macro and micro level to validate that the correct data is being submitted. At the macro level, the system verifies that the file sent has been sent in a readable format (CSV or XML) with the correct number of columns. It also verifies how many of the requested data elements have been provided. At the micro level, the system verifies whether each data field provided matches a certain set of pre-defined characteristics (detailed below in the Data Characteristics section). The system will provide feedback through the website to help ensure that data is correctly formatted.

Requested Data Files

Data from the participating institutions would be submitted for the following four submission types:

1. Award
2. Employee
3. Sub-Award
4. Vendor

Please note that an Indirect Cost Proposal Ratio is also requested. However, this document does not need to be sent quarterly and has unique specifications. The details below pertain only to the four files listed above. See the Indirect Cost Proposal Specifications section for further details.

Each file type could be submitted in one of the following two data file formats:

1. XML
2. CSV

When submitting files, institutions were requested to use the following format for the file names:

UniversityAbbreviation_FileType_DateSubmitted using underscores and YYYY_MM_DD for the date

Ex. UnivX_Award_2010_12_30

Data Element Names

The following data fields are included in the data files.

All Fields

| <i>Data Field Name</i> | <i>XML/CSV Element/Field Name</i> |
|---|---|
| Period Start Date | PeriodStartDate |
| Period End Date | PeriodEndDate |
| Unique Award Number | UniqueAwardNumber |
| Recipient Account Number | RecipientAccountNumber |
| Overhead Charged | OverheadCharged |
| De-identified Employee ID Number | DeidentifiedEmployeeIdNumber |
| Occupational Classification | OccupationalClassification |
| FTE Status | FteStatus |
| Proportion of Earnings Allocated to Award | ProportionOfEarningsAllocatedToAward <i>OR</i> ProportionOfEarningsAllocated |
| Sub-Award Recipient DUNS Number | SubAwardRecipientDunsNumber |
| Sub-Award Payment Amount | SubAwardPaymentAmount |
| Vendor DUNS Number | VendorDunsNumber |
| Vendor Payment Amount | VendorPaymentAmount |

Data Elements by Data File

| <i>Data File Type</i> | <i>Element/Field Name</i> |
|-----------------------|---|
| Award | PeriodStartDate |
| | PeriodEndDate |
| | UniqueAwardNumber |
| | RecipientAccountNumber |
| | OverheadCharged |
| Employee | PeriodStartDate |
| | PeriodEndDate |
| | UniqueAwardNumber |
| | RecipientAccountNumber |
| | DeidentifiedEmployeeIdNumber |
| | OccupationalClassification |
| | FteStatus |
| | ProportionOfEarningsAllocatedToAward <i>OR</i> ProportionOfEarningsAllocated |
| Sub-Award | PeriodStartDate |
| | PeriodEndDate |
| | UniqueAwardNumber |
| | RecipientAccountNumber |
| | SubAwardRecipientDunsNumber |
| | SubAwardPaymentAmount |
| Vendor | PeriodStartDate |
| | PeriodEndDate |

| | |
|--|------------------------|
| | UniqueAwardNumber |
| | RecipientAccountNumber |
| | VendorDunsNumber |
| | VendorPaymentAmount |

Data File Validation

Various validations are done on each submitted file based on the data file format and on the individual data elements. These validations helped to ensure that the correct data is being sent and processed. Any data submitted will be analyzed based on the data characteristics specifications listed below. The Data Characteristics section details all possible exceptions and clarifications.

Note: When "standard XSD" data types are referenced below they are referring to the data types defined in the namespace <http://www.w3.org/2001/XMLSchema>.

XML Document Level Validation

XML files are validated to ensure they match the structure and format specified in the STAR METRICS® Data Files XSD (StarMetricsDataFiles.xsd). See Appendix B or the website for the XSD code. Data is also checked to ensure they pass the validations in the Data Characteristics section below.

Example XML files for each submission type are available on the STAR METRICS® website.

Please note that the parent element for Employee submissions should be <Individual> instead of <Employee>.

CSV Document Level Validation

CSV files will be validated to ensure they are in the proper CSV format. Please note to include a header row where the CSV column names are the same as the field names listed above, namely:

Award

PeriodStartDate,PeriodEndDate,UniqueAwardNumber,RecipientAccountNumber,OverheadCharged

Employee

PeriodStartDate,PeriodEndDate,UniqueAwardNumber,RecipientAccountNumber,DeidentifiedEmployeeIdNumber,OccupationalClassification,FteStatus,ProportionOfEarningsAllocatedToAward

OR

PeriodStartDate,PeriodEndDate,UniqueAwardNumber,RecipientAccountNumber,DeidentifiedEmployeeIdNumber,OccupationalClassification,FteStatus,ProportionOfEarningsAllocated

Vendor

PeriodStartDate,PeriodEndDate,UniqueAwardNumber,RecipientAccountNumber,VendorDunsNumber,VendorPaymentAmount

Sub-Award

PeriodStartDate,PeriodEndDate,UniqueAwardNumber,RecipientAccountNumber,SubAwardRecipientDunsNumber,SubAwardPaymentAmount

Data Characteristics

In addition to the document level validation, the individual fields will be validated. Each element in the XML files is described below.

PeriodStartDate

- The field is required and should be specified exactly once per parent element.
- The start date should reflect the beginning of the time period in which the transaction occurred, not the start date of the award.
- Should be in standard XSD date format (YYYY-MM-DD).

Examples

| <i>Value</i> | <i>Is Valid?</i> | <i>Notes</i> |
|--------------|------------------|--------------------------------------|
| 2009-12-31 | Yes | |
| 12/31/2009 | No | Not in the standard XSD date format. |

PeriodEndDate

- PeriodEndDate has the same data type and rules as PeriodStartDate with the following additional rule:
- Should be greater than or equal to the value of PeriodStartDate within the same parent element.
- The end date should reflect the ending of the time period in which the transaction occurred, not the end date of the award.

UniqueAwardNumber

- The field is required and should be specified exactly once per parent element.
- The field is made up of a funding source code and an award identifier:
 - The funding source code portion is either the CFDA code (for federal awards) or the STAR Other Funding Source (OFS) code (for non-federal awards or those without CFDA codes).
 - The award identifier is either the actual federal award ID (for federal awards) or an internal award identifier (for non-federal awards).
- Both the funding source and award identifier components are required.

- The award identifier is an arbitrary string with no specific formatting requirements.
- The minimum length for the award identifier component is 1 character.
- The maximum length for the award identifier component is 50 characters.
- The funding source component is of the format: **##.###** where # is a digit from 0 to 9.
- The funding source component should be prepended before the award identifier component and separated with a space as in:

```
[Funding Source] [Award Identifier]
```

```
00.000 [1- to 50-character award identifier]
```
- If neither a CFDA code nor OFS code is available or applicable, then the funding source component should be set to 00.000.
- If the award identifier component is unknown, then a zero should be inserted after a blank space, as in “47.123 0” rather than merely “47.123”.
- If the funding source component is a CFDA code and only the first two digits are available, three trailing zeros should be used to match the **##.###** format (e.g. 33.000).
- [A list of OFS codes](#) is available on the [Resources page](#) of the STAR METRICS® website.

Examples

| <i>Value</i> | <i>Is Valid?</i> | <i>Notes</i> |
|----------------------|------------------|--|
| 12.345 abcde12345 | Yes | CFDA is 12.345 and the federal award ID is abcde12345. |
| 12.000 abcde12345 | Yes | CFDA is 12 and the federal award ID is abcde12345. Trailing zeros are appended to two digit CFDA code. |
| 00.000 abcde-12345 | Yes | No applicable funding source code is available and the award identifier is abcde-12345. |
| 00.200 State Award 1 | Yes | OFS code (non-federal award) is 00.200 (home state funding) and the award identifier is “State Award 1”. Note that spaces are allowed in the award identifier component. |
| 12.345abcde12345 | No | CFDA is 12.345 and the federal award ID is abcde12345. There is no space between the funding source and award identifier components. |

| | | |
|------------|----|--|
| 12.345 | No | CFDA is 12.345 but no federal award ID was included. A blank space and then a zero should be added if the award ID is unknown (e.g. 12.345 0). |
| abcde12345 | No | CFDA is not available and the award identifier is abcde12345. In this case, the funding source component is missing. |

RecipientAccountNumber

- The field is required and should be specified exactly once per parent element.
- The value is an arbitrary string with no specific formatting requirements.
- The min length for the value is 1 character.
- The max length for the value is 255 characters.

OverheadCharged

- The field is required and should be specified exactly once per parent element.
- Should be in standard XSD decimal format.
- Any value with more than two decimal places will be rounded to two decimal places.

Examples

| <i>Value</i> | <i>Is Valid?</i> | <i>Notes</i> |
|--------------|------------------|--|
| 1000 | Yes | |
| 1000.1 | Yes | |
| 1000.12 | Yes | |
| 1000.123 | Yes | |
| 0 | Yes | Zero is ok. |
| -1000 | Yes | Negative numbers are ok. |
| \$1000 | No | The dollar sign is not allowed by the XSD decimal data type. |
| 1,000 | No | Commas are not allowed by the XSD decimal data type. |

DeidentifiedEmployeeIdNumber

- The field is required and should be specified exactly once per parent element.

- The value is an arbitrary string with no specific formatting requirements.
- The min length for the value is 1 character.
- The max length for the value is 50 characters.

OccupationalClassification

- The field is required and should be specified exactly once per parent element.
- The value is an arbitrary string with no specific formatting requirements.
- The min length for the value is 1 character.
- The max length for the value is 255 characters.

FteStatus

- The field is required and should be specified exactly once per parent element.
- Should be in standard XSD decimal format.
- The value should be greater than or equal to zero.
- The max value is 1.
- Any value with more than four decimal places will be rounded to four decimal places.
- If FTE status cannot be determined, please notify the STAR METRICS® team. Some institutions have chosen FTEs based on type of job held when exact calculations cannot be determined, for example using 0.25 FTE for undergraduate positions, 0.5 FTE for graduate student positions and 1.0 FTE for all other positions.

1 Examples

| <i>Value</i> | <i>Is Valid?</i> | <i>Notes</i> |
|--------------|------------------|---|
| 1 | Yes | |
| 1.0 | Yes | |
| 0.5 | Yes | |
| 0.1 | Yes | |
| 0.5678 | Yes | |
| 1.5 | No | Numbers greater than 1 are not allowed. |
| 0 | Yes | |
| -0.5 | No | Negative numbers are not allowed. |

ProportionOfEarningsAllocatedToAward* or *ProportionOfEarningsAllocated

- The field is required and should be specified exactly once per parent element.
- Either name can be used for this field. The shorter name was introduced to address the character limit for column headings in some HR systems.
- Should be in standard XSD decimal format.

- The minimum value is -1000 (exclusive).
- The value can be zero (e.g. the Individual is on the contract but didn't charge any time).
- The max value is 1000 (exclusive).
- Any value with more than four decimal places will be rounded to four decimal places.

Examples

| <i>Value</i> | <i>Is Valid?</i> | <i>Notes</i> |
|--------------|------------------|--|
| 1 | Yes | |
| 1.0 | Yes | |
| 0.5 | Yes | |
| 0.1 | Yes | |
| 0.5678 | Yes | |
| 0 | Yes | |
| -0.5 | Yes | |
| -1 | Yes | |
| 1000 | No | Numbers 1000 or greater are not allowed. |
| -1000 | No | Numbers -1000 or less are not allowed. |
| 999.9999 | Yes | Number is less than 1000. |
| -999.9999 | Yes | Number is greater than -1000. |

SubAwardRecipientDunsNumber

- The field is required and should be specified exactly once per parent element.
- The field value should contain a DUNS number, a 5 or 9 digit ZIP code, or be an empty element (e.g. `<SubAwardRecipientDunsNumber></SubAwardRecipientDunsNumber>` or `<SubAwardRecipientDunsNumber />`).
- If the DUNS number is available it should be used.
- If the DUNS number is not available but the ZIP code is available the ZIP code should be used.

- If the DUNS number and ZIP code are not available an empty element should be included.
- If a DUNS number is specified, the format of the DUNS number should be ##### where # is a digit from 0 to 9.
- If a 5 digit ZIP code is specified, it should be in the format Z##### where # is a digit from 0 to 9.
- If a 9 digit ZIP code is specified, it should be in the format Z##### or Z#####-#### where # is a digit from 0 to 9.
- If a foreign postal code is being used, place an F before the postal code to indicate that it is foreign. Foreign postal codes do not need to follow the prescribed format above for 5 or 9 digit postal codes. Note that you may only include up to 9 characters (excluding the F prefix) for foreign postal codes.

Examples

| <i>Value</i> | <i>Is Valid?</i> | <i>Notes</i> |
|--------------|------------------|---|
| 123456789 | Yes | This will be treated as a DUNS number. |
| Z12345 | Yes | This will be treated as a 5 digit ZIP code. |
| Z123456789 | Yes | This will be treated as a 9 digit ZIP code. |
| Z12345-6789 | Yes | This will be treated as a 9 digit ZIP code. |
| FDK-1234 | Yes | This will be treated as the foreign postal code 'DK-1234'. |
| 1234567890 | No | There can be a maximum of 9 digits. |
| 12345-6789 | No | DUNS numbers cannot have dashes and there is no "Z" present to indicate this is a ZIP code. |
| 12345 | No | DUNS numbers should be 9 digits and there is no "Z" present to indicate this is a ZIP code. |
| FABC123DEF | Yes | This will be treated as the foreign postal code 'ABC123DEF'. |
| FABC 123-DE | No | This exceeds the character limit. Spaces and hyphens are included in the 9-character limit (excluding the F prefix) for foreign postal codes. |

SubAwardPaymentAmount

See rules for OverheadCharged.

VendorDunsNumber

See rules for SubAwardRecipientDunsNumber.

VendorPaymentAmount

See rules for OverheadCharged.

SubAwardPaymentAmount

See rules for OverheadCharged.

Indirect Cost Rate Proposal Specifications

Information on Overhead comes from the institution's Indirect Cost Proposal. This requires the calculation of one number that should be provided initially and updated when there is a change. A subset of the STAR METRICS® FDP working group has determined that the least burdensome approach is as follows:

Retrieve the institution's adjusted cost by cost pool. Then calculate the total salaries and fringe benefits, as well as the total non-labor costs. Sum each across cost pools, and calculate the proportion as (salaries and fringe benefits)/(salaries and fringe benefits plus non labor costs).

Note that these are intended to produce estimates of jobs in a statistical context, not an accounting context.

7. Appendix B: XSD Code

```
<?xml version="1.0" encoding="utf-8"?>
<xs:schema id="StarMetricsDataFiles" targetNamespace="star-metrics-data-files" xmlns:star="star-
metrics-data-files" elementFormDefault="qualified" xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:simpleType name="UniqueAwardNumberElement">
    <xs:restriction base="xs:string">
      <xs:minLength value="1" />
      <xs:maxLength value="50" />
    </xs:restriction>
  </xs:simpleType>

  <xs:simpleType name="RecipientAccountNumberElement">
    <xs:restriction base="xs:string">
      <xs:minLength value="1" />
      <xs:maxLength value="255" />
    </xs:restriction>
  </xs:simpleType>

  <xs:simpleType name="DeidentifiedEmployeeIdNumberElement">
    <xs:restriction base="xs:string">
      <xs:minLength value="1" />
      <xs:maxLength value="50" />
    </xs:restriction>
  </xs:simpleType>

  <xs:simpleType name="OccupationalClassificationElement">
    <xs:restriction base="xs:string">
      <xs:minLength value="1" />
      <xs:maxLength value="255" />
    </xs:restriction>
  </xs:simpleType>

  <xs:simpleType name="FteStatusElement">
    <xs:restriction base="xs:decimal">
      <xs:minInclusive value="0" />
      <xs:maxInclusive value="1" />
    </xs:restriction>
  </xs:simpleType>

  <xs:simpleType name="ProportionOfEarningsAllocatedToAwardElement">
    <xs:restriction base="xs:decimal">
      <xs:minExclusive value="-1000" />
      <xs:maxExclusive value="1000" />
    </xs:restriction>
  </xs:simpleType>

  <xs:complexType name="AwardsElement">
    <xs:sequence>
      <xs:choice minOccurs="0" maxOccurs="unbounded">
        <xs:element name="Award">
          <xs:complexType>
            <xs:sequence>
              <xs:element name="PeriodStartDate" type="xs:date" minOccurs="1" maxOccurs="1" />
              <xs:element name="PeriodEndDate" type="xs:date" minOccurs="1" maxOccurs="1" />
              <xs:element name="UniqueAwardNumber" type="star:UniqueAwardNumberElement"
minOccurs="1" maxOccurs="1" />
              <xs:element name="RecipientAccountNumber" type="star:RecipientAccountNumberElement"
minOccurs="1" maxOccurs="1" />
              <xs:element name="OverheadCharged" type="xs:decimal" minOccurs="1" maxOccurs="1" />
            </xs:sequence>
          </xs:complexType>
        </xs:element>
      </xs:choice>
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="IndividualsElement">
    <xs:sequence>
      <xs:choice minOccurs="0" maxOccurs="unbounded">
        <xs:element name="Individual">
```

```

        <xs:complexType>
          <xs:sequence>
            <xs:element name="PeriodStartDate" type="xs:date" minOccurs="1" maxOccurs="1" />
            <xs:element name="PeriodEndDate" type="xs:date" minOccurs="1" maxOccurs="1" />
            <xs:element name="UniqueAwardNumber" type="star:UniqueAwardNumberElement"
minOccurs="1" maxOccurs="1" />
            <xs:element name="RecipientAccountNumber" type="star:RecipientAccountNumberElement"
minOccurs="1" maxOccurs="1" />
            <xs:element name="DeidentifiedEmployeeIdNumber"
type="star:DeidentifiedEmployeeIdNumberElement" minOccurs="1" maxOccurs="1" />
            <xs:element name="OccupationalClassification"
type="star:OccupationalClassificationElement" minOccurs="1" maxOccurs="1" />
            <xs:element name="FteStatus" type="star:FteStatusElement" minOccurs="1"
maxOccurs="1" />
            <xs:element name="ProportionOfEarningsAllocatedToAward"
type="star:ProportionOfEarningsAllocatedToAwardElement" minOccurs="1" maxOccurs="1" />
          </xs:sequence>
        </xs:complexType>
      </xs:element>
    </xs:choice>
  </xs:sequence>
</xs:complexType>

<xs:complexType name="SubAwardsElement">
  <xs:sequence>
    <xs:choice minOccurs="0" maxOccurs="unbounded">
      <xs:element name="SubAward">
        <xs:complexType>
          <xs:sequence>
            <xs:element name="PeriodStartDate" type="xs:date" minOccurs="1" maxOccurs="1" />
            <xs:element name="PeriodEndDate" type="xs:date" minOccurs="1" maxOccurs="1" />
            <xs:element name="UniqueAwardNumber" type="star:UniqueAwardNumberElement"
minOccurs="1" maxOccurs="1" />
            <xs:element name="RecipientAccountNumber" type="star:RecipientAccountNumberElement"
minOccurs="1" maxOccurs="1" />
            <xs:element name="SubAwardRecipientDunsNumber" type="xs:string" minOccurs="1"
maxOccurs="1" />
            <xs:element name="SubAwardPaymentAmount" type="xs:decimal" minOccurs="1"
maxOccurs="1" />
          </xs:sequence>
        </xs:complexType>
      </xs:element>
    </xs:choice>
  </xs:sequence>
</xs:complexType>

<xs:complexType name="VendorsElement">
  <xs:sequence>
    <xs:choice minOccurs="0" maxOccurs="unbounded">
      <xs:element name="Vendor">
        <xs:complexType>
          <xs:sequence>
            <xs:element name="PeriodStartDate" type="xs:date" minOccurs="1" maxOccurs="1" />
            <xs:element name="PeriodEndDate" type="xs:date" minOccurs="1" maxOccurs="1" />
            <xs:element name="UniqueAwardNumber" type="star:UniqueAwardNumberElement"
minOccurs="1" maxOccurs="1" />
            <xs:element name="RecipientAccountNumber" type="star:RecipientAccountNumberElement"
minOccurs="1" maxOccurs="1" />
            <xs:element name="VendorDunsNumber" type="xs:string" minOccurs="1" maxOccurs="1" />
            <xs:element name="VendorPaymentAmount" type="xs:decimal" minOccurs="1"
maxOccurs="1" />
          </xs:sequence>
        </xs:complexType>
      </xs:element>
    </xs:choice>
  </xs:sequence>
</xs:complexType>

<xs:element name="Awards" type="star:AwardsElement" />
<xs:element name="Individuals" type="star:IndividualsElement" />
<xs:element name="SubAwards" type="star:SubAwardsElement" />

```

```
<xs:element name="Vendors" type="star:VendorsElement" />
</xs:schema>
```